



(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
20 March 2003 (20.03.2003)

PCT

(10) International Publication Number
WO 03/023674 A1

(51) International Patent Classification⁷: **G06F 17/60**

(21) International Application Number: **PCT/KR01/01981**

(22) International Filing Date:
20 November 2001 (20.11.2001)

(25) Filing Language: **Korean**

(26) Publication Language: **English**

(30) Priority Data:
2001-55746 11 September 2001 (11.09.2001) KR

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(81) Designated States (*national*): AE, AG, AI, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.

(84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— *with international search report*

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WO 03/023674 A1

(54) Title: **SYSTEM AND METHOD FOR CREDIT CARD PAYMENT USING BARCODE AND MOBILE PHONE DEVICE**

(57) Abstract: This invention relates to a system and method for credit card payment using barcode and mobile device. This invention discloses a credit card payment system and method which comprises displaying barcode which includes credit card payment information on the display part of user's mobile phone device; reading such a barcode with a barcode-reader device; and acquiring the credit card payment information and payment acknowledgement.

SYSTEM AND METHOD FOR CREDIT CARD PAYMENT USING BARCODE AND MOBILE PHONE DEVICE

Technical Field

The present invention relates generally to a system and method for credit card payment using barcode and mobile phone device, in particular, to a system and method wherein a barcode which stores credit card information of a user is displayed on the display part of a mobile phone device, the barcode is then read by a barcode reader device, so that all information necessary for a credit card payment is acquired to enable a payment authentication through a credit card validation device.

10

Background Art

The credit card has emerged nowadays to an indispensable item of everyday life, and the frequency and extent of its use are rapidly expending, so that most credit card users carry three to four credit cards in their purses. Although the merit of a credit card is tremendous in that it exempts a user from the burden of carrying currency, but it can also generate various troubles once it gets lost or is stolen.

According to a statistic, an average card user loses two or more credit cards in a year. In view of this statistic, the waste in time and costs for reissuing the credit cards lost or stolen grows enormous for the whole society.

20 Furthermore, a credit card stores information necessary for a payment procedure in the magnetic band attached on the rear side thereof, allowing a credit card-reader device to acquire this information by reading the band. Another problem with the credit card is



that its magnetic band can easily be damaged. Once the magnetic band is damaged, the credit card is normally reissued, causing additional waste in time and costs.

On the other hand, mobile phones have recently been so rapidly widespread that most users carry one or more mobile phones with them. Payments for commercial trades

5 using a mobile phone are performed on the Internet usually for small amounts, and the purchase invoices are issued combined with the invoices for the mobile phone fees. Thus, there has been a demand for a system, which allows a user to achieve an effect by using his mobile phone, which is now owned by most users, comparable to the effect of a credit card.

10 Disclosure of the Invention

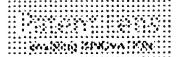
To solve the above problems, the present invention provides a credit card payment system allowing a payment without a credit card using a conventional credit card validation device, wherein a barcode storing credit card information of a user is displayed on the display part of a mobile phone, the barcode is then read by a barcode reader device, 15 so that all information necessary for a credit card payment is acquired to enable a payment authentication through a credit card validation device.

In order to achieve the above objective, the system for credit card payment using barcode and mobile phone device in accordance with the present invention is consisted of a mobile phone device which is capable of storing barcode data representing the information 20 necessary for a credit card payment and which comprises a display part for displaying the above barcode data; a barcode reader device capable of reading the barcode displayed on the display part of the above mobile phone device; and a credit card validation device which, while connected to the above barcode reader device, extracts the credit card

payment information from the barcode as it is read by the above barcode reader device, to subsequently transmit the payment information to a credit card VAN server and to receive a payment authentication signal.

Further, in order to achieve the above objective, the method in accordance with
5 the present invention using the system for credit card payment using barcode and mobile phone device, including a mobile phone device which is storing barcode data representing the information necessary for a credit card payment and which comprises a display part for displaying the above barcode data; a barcode reader device reading the barcode displayed on the display part of the above mobile phone device; and a credit card validation device
10 being connected to the above barcode reader device, extracts the credit card payment information data from the barcode as it is read by the above barcode reader device, to subsequently transmit the payment information to a credit card VAN server and to receive a payment authentication signal, comprises the steps of displaying the above barcode data on the display part of the above mobile phone device in the form of bars; of reading the
15 barcode displayed on the display part of the above mobile phone device by the above barcode reader device; of transmitting the barcode data as it is read by the above barcode reader device to the above credit card validation device; and of receiving a payment authentication signal from the credit card VAN server by the above credit card validation device after the credit card payment information contained in the barcode data has been
20 extracted and transmitted to the credit card VAN server via a credit card VAN.

The present invention allows convenient application of a credit card payment with a mobile phone device, without use of a credit card, by displaying the barcode containing the credit card information of a user on the display part of a mobile phone device, by



reading the barcode and obtaining the information necessary for a credit card payment, and finally by acquiring an authentication to pay from the credit card validation device.

Furthermore, the present invention, by allowing application of a conventional credit card validation device if this device is added with a barcode reader device, without 5 necessitating a total substitution of the devices and system, provides economic advantages.

In addition, since the present invention enables a credit card payment using a mobile phone device alone, without the need of carrying any credit card with, it helps to save the enormous waste in both time and costs required for substitution of the lost credit cards

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Brief Description of the Drawings

Fig. 1 shows a system construction of an embodiment of the present invention.

Figs. 2A and 2B are examples illustrating one-dimensional barcode and two-dimensional barcode, respectively.

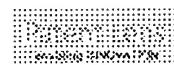
15 Fig. 3 is a flowchart showing an embodiment of the method for credit card payment in accordance with the present invention.

Fig. 4 is an embodiment construction showing how a barcode is inserted into a mobile phone device.

20 Fig. 5 is another embodiment construction showing how a barcode is inserted into a mobile phone device.

Preferred Embodiments of the invention

The preferred embodiments of the system and method in accordance with the



present invention are described below in detail referring to the accompanying drawings.

Fig. 1 shows a system construction of an embodiment of the present invention.

As shown in Fig. 1, an embodiment of the system in accordance with the present

invention is consisted of a mobile phone device 10 capable of storing barcode data which

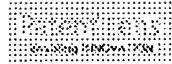
- 5 represents the credit card information required for a credit card payment and capable of displaying the barcode on the display part thereof, a barcode reader device 20 capable of reading the barcode displayed on the display part of the above mobile phone device, and a credit card validation device 30, which, while connected to the above barcode reader device 20, can extract the information necessary for a credit card payment from the
- 10 barcode as it is read by the above barcode reader device 20, transmits the information to the credit card VAN server 40 and receive a payment authentication.

The above mobile phone device 10 comprises all communication means which are suitable for wireless voice and data communications, such as a cellular phone, a PCS terminal, an IMT-2000 terminal, or a PDA terminal, and which have a display part such as

- 15 a LCD widely used these days, and capable of displaying a barcode on a display part.

A barcode is a code generated by combining black and white bars, capable of constituting a data based on the ratio between these two components. That is, it is a code system capable of representing information in the form of divergent patterns consisted of bars with various width and blanks in either one-dimensional or two-dimensional form.

- 20 A one-dimensional barcode takes a simple form by combining data on the horizontal axis (x axis). Since its introduction in the early 1970s, many different types of one-dimensional barcode have been developed, the length of the symbol has become variable, acquiring enhanced error detecting function as well as enhanced data density, so



that this barcode is used not to represent product information and circulation information as such, but rather to represent a data key for access to a database containing product information and circulation information.

A two-dimensional barcode is generated by combining data on the horizontal (x) 5 and vertical (y) axis, and then projected to a plane. This barcode, since it allows representation of more data, has been introduced in the mid 1980s in order to overcome the limitation in data representation a one-dimensional barcode had.

Figs. 2A and 2B are examples illustrating one-dimensional barcode and two-dimensional barcode, respectively. Although both one-dimensional barcode and two- 10 dimensional barcode are compatible for a credit card payment in accordance with the present invention insofar as they carry information necessary for a credit card payment, use of two-dimensional barcode is preferable for a more effective representation of larger data.

A barcode can be displayed on the display part of a mobile phone device 10 in various ways, e.g. storing in the ROM at the time of manufacturing a mobile phone, 15 downloading via a communication cable on a mobile phone at the time of issuing a credit card, downloading from a server via the wireless Internet or SMS, etc., an explanation whereon follows later.

A barcode which is displayed on the display part of a mobile phone device 10 can be read by a barcode reader device 20 as illustrated in Fig. 1. A conventional barcode 20 reader device can be used as a barcode reader device 20 for the purpose of the present invention. The barcode reader device 20 performs by reading the same function as a credit card validation device when the latter reads a magnetic band on the rear side of a credit card while the credit card is inserted in the slot thereof.

The data thus read by the above credit card reader device 20 is then transmitted to the credit card validation device 30 via a communication cable. Also the credit card validation device 30 is the same as a conventional credit card validation device, with the only difference that an interface capable of receiving the data read by the credit card reader device 20 is additionally installed in it. Accordingly, the present invention can be worked with a conventional credit card validation device in the conventional way, only if the composition of its internal circuits is slightly adapted. A data transmission from the barcode reader device 20 is made using e.g. RS-232C port, but is not restricted thereto.

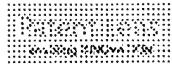
The credit card validation device 30, upon receipt of a data relating to a credit card payment from the barcode reader device 20, accesses the credit card VAN server 40 via the credit card VAN in conventional manner, and waits for a credit card payment authentication signal.

Fig. 3 is a flowchart showing an embodiment of the method for credit card payment in accordance with the present invention.

First, a user displays a barcode containing credit card payment information in a predetermined manner on the display part of a mobile phone device 10 (S100). Here, an additional step of authentication such as input of passwords can be installed to ensure trade security.

Then, the barcode displayed on the display part of the mobile phone device is so faced to the barcode reader device 20 that the credit card payment information represented by the barcode is read (S110), whereupon the barcode reader device 20 transmits the credit card payment information thus read to the credit card validation device 30 (S120).

The credit card validation device 30 transmits the received credit card payment



information to the credit card VAN server 40 via the credit card VAN (S130), and waits for a credit card payment authentication signal from the credit card VAN server 40, which confirms normal use of the credit card based on a predetermined procedure.

After receipt of the payment authentication signal from the credit card VAN 5 server 40 (S140), the credit card payment procedure terminates with input of the payment amount, installment, etc. and issuance of a sales slip.

Fig. 4 is an embodiment construction showing how a barcode is inserted into a mobile phone device as in Figs. 1 through 3.

As shown in Fig. 4, if a mobile phone user 50 accesses a mobile 10 telecommunication service server 60 via the wireless Internet and requests (to issuance) a credit card, the mobile telecommunication service server 60 in turn accesses the credit card service server 70 to be confirmed as to whether the user is a registered credit card user.

If the user is confirmed a user of the registered credit card by the credit card service server 70, the mobile telecommunication service server 60 receives a barcode 15 containing a credit card payment information inclusive of the credit card number from the credit card service server 70, and then transmits the barcode to the mobile phone device 50. The mobile phone device 50 stores the barcode thus transmitted in the memory part thereof and fetches it for use of the credit card.

Fig. 5, being another embodiment construction showing how a barcode is 20 inserted into a mobile phone device as used in Figs. 1 through 3, shows an example, wherein a credit card service server transmits a barcode to a mobile phone device via a cable, upon request of a user for a credit card using an online or off-line means other than a mobile phone device.

First, a user requests for issuance of a credit card personally at a relevant financial institution such as a bank, a credit card company, etc., or on the Internet. The financial institution, then determines whether issue one after having confirmed the requirements for issuance, and requests the user to visit the institution with his mobile phone device.

5 Then, the user downloads the credit card payment information including the credit card number in form of, e.g. VM (Virtual machine) program after the connection port of his mobile phone device is connected to the credit card service server via a cable (during his visit to the credit card institution). Once a barcode including the credit card payment information is stored in the mobile phone device as described above, the barcode can be
10 fetched for use of the credit card as shown in Figs. 1 through 3.

Alternatively, a barcode comprising the credit card payment information can be inserted in a mobile phone device already in the manufacturing process of the mobile phone. In such case, it can be so regulated that each mobile phone device corresponds to a separate credit card based on an agreement between a credit card institution and its partner
15 mobile phone manufacturer. The agreement can regulate, for example, to store the barcode data in the ROM part of the mobile phone where the internal program of the mobile phone is also stored, so that every purchaser of a mobile phone is regarded to be a user to whom the corresponding credit card is issued, authorizing him to immediately utilize the credit card payment procedure with his mobile phone device.

20 Although the present invention has been described above with respect to particular embodiments, it is not limited thereto, allowing modifications, changes, adaptations, etc. within the scope of the present invention, as those skilled in the art will understand.

Industrial Applicability

Since the present invention enables a credit card payment with a mobile phone device without a credit card, it helps to save tremendous waste in both time and costs
5 required for reissue of lost, stolen, or damaged credit cards.

Further, since the present invention allows a mobile phone device to function as a mobile phone as well as a credit card, a user is eased by carrying just one item instead of the above two different items, and is freed from the worry of losing or damaging a credit card.

10 In addition, since the present invention allows a conventional credit card validation device to be further used for the purpose of the present invention with a slight modification of the device, application thereof is very economical.



What is claimed is:

1. A system for credit card payment using barcode and mobile phone device comprising:
 - a mobile phone device storing a barcode data required for a credit card payment 5 (in it), and including a display part for display of said barcode data thereon;
 - a barcode reader device reading the barcode displayed on the display part of said mobile phone device; and
 - a credit card validation device, being connected to said barcode reader device, fetching the credit card payment information data from the barcode which is read by said 10 barcode reader device, transmits said information to a credit card VAN server, and then, receives a credit card payment authentication signal from said credit card VAN server.
2. The system for credit card payment using barcode and mobile phone device as set forth in Claim 1, wherein said barcode is a two-dimensional barcode extended 15 in both horizontal and vertical axis by a predetermined width.
3. The system for credit card payment using barcode and mobile phone device as set forth in any one of Claims 1 or 2, wherein said credit card validation device comprises an interface part receiving a barcode data which is read by said barcode reader 20 device.
4. The system for credit card payment using barcode and mobile phone device as set forth in Claim 3, wherein said barcode reader device is connected to said



credit card validation device through a RS-232C port.

5. A method for credit card payment using barcode and mobile phone device, utilizing a system (for credit card payment) consisted of:

5 a mobile phone device capable of storing a barcode data required for a credit card payment (in it), which comprises a display part for display of said barcode data thereon;

a barcode reader device capable of reading the barcode displayed on the display part of said mobile phone device; and

a credit card validation device connected to said barcode reader device,

10 comprising the steps:

of displaying said barcode data on the display part of said mobile phone device in the form of a barcode;

of reading said barcode displayed on the display part of said mobile phone device by said barcode reader device;

15 of transmitting the barcode data as it is read by said barcode reader device to said credit card validation device; and

of fetching the credit card payment information contained in said barcode data and transmitting said information by said credit card validation device to a (said?) credit card VAN server via a credit card VAN, and of receiving a credit card payment

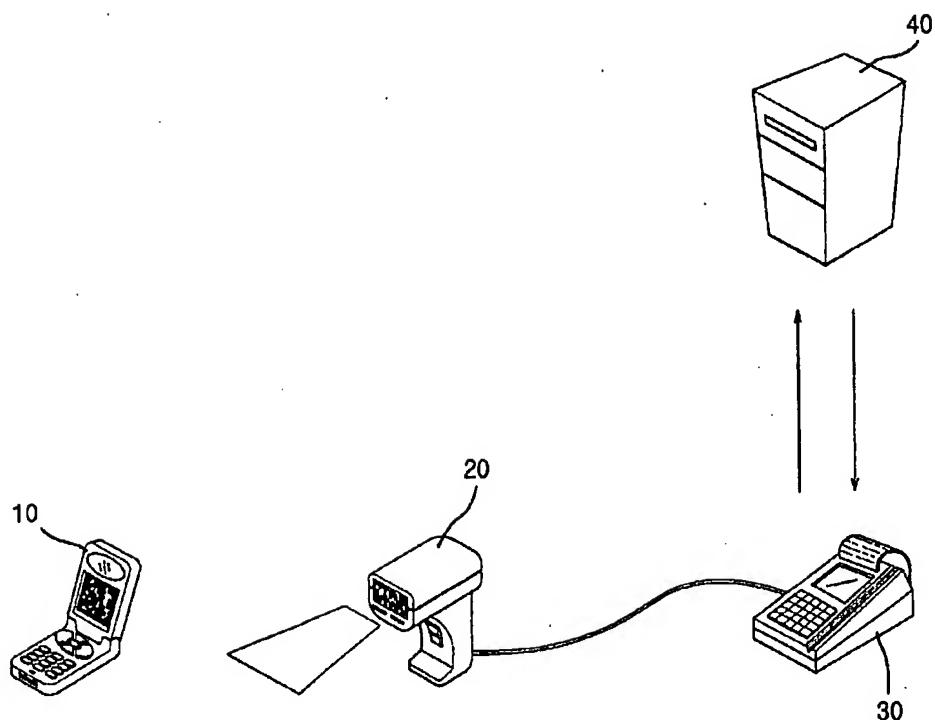
20 authentication signal from said credit card VAN server.

6. The method for credit card payment using barcode and mobile phone device as set forth in Claim 5, wherein said step of displaying said barcode data on the



display part of said mobile phone device in the form of a barcode additionally comprises a step of user authentication for identification of a user.

FIG. 1



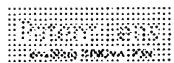


FIG. 2A

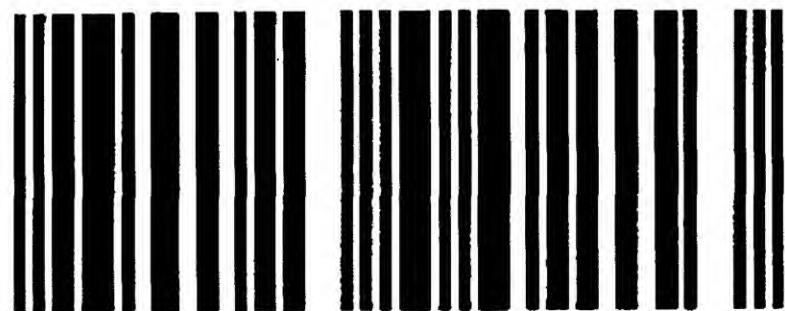


FIG. 2B

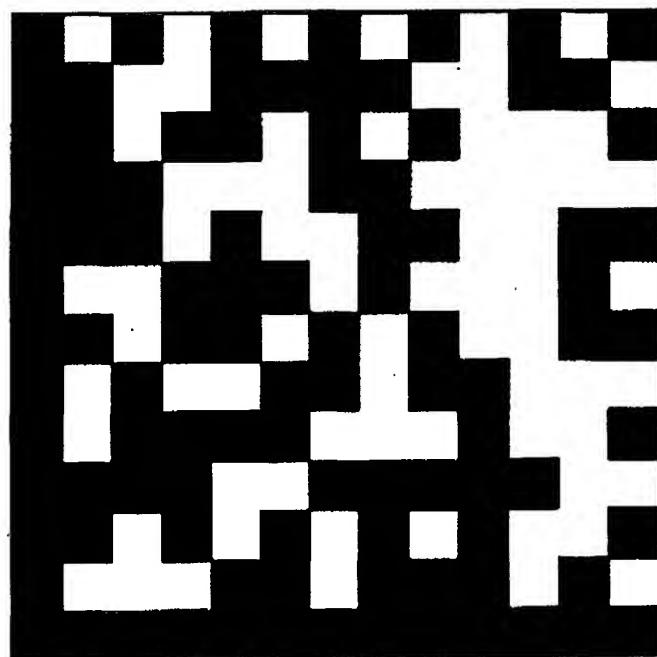


FIG. 3

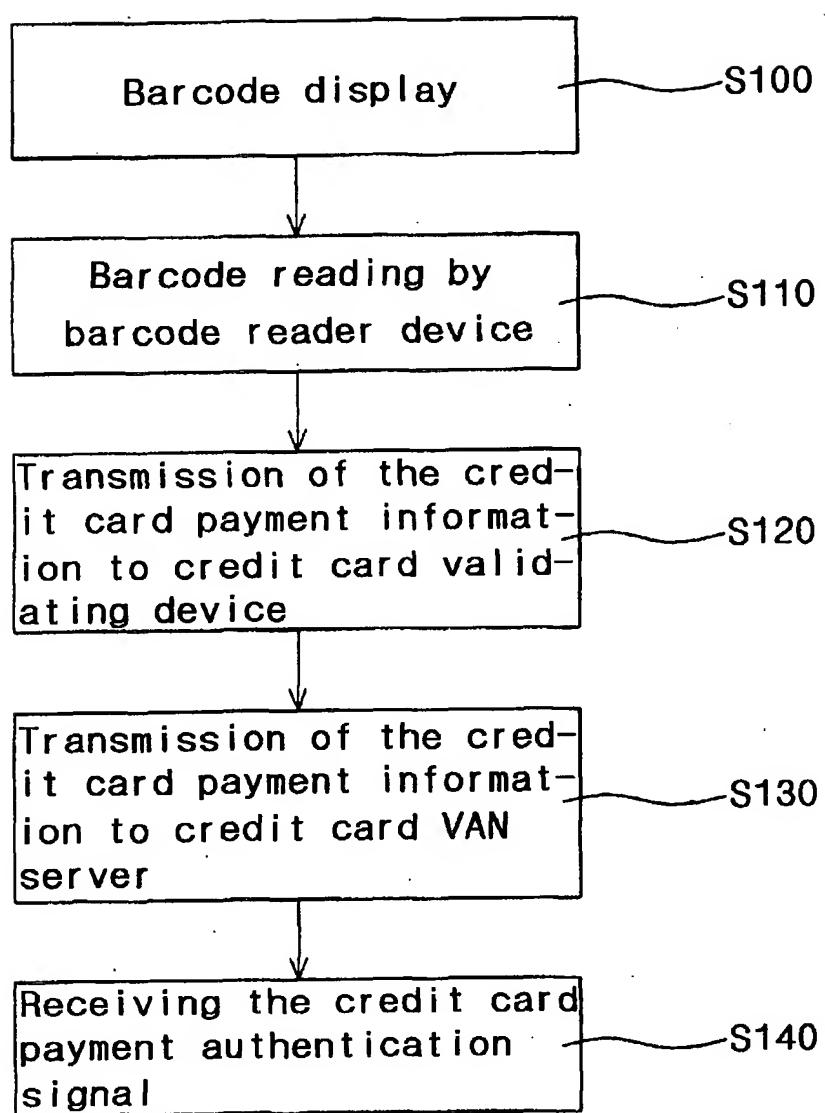


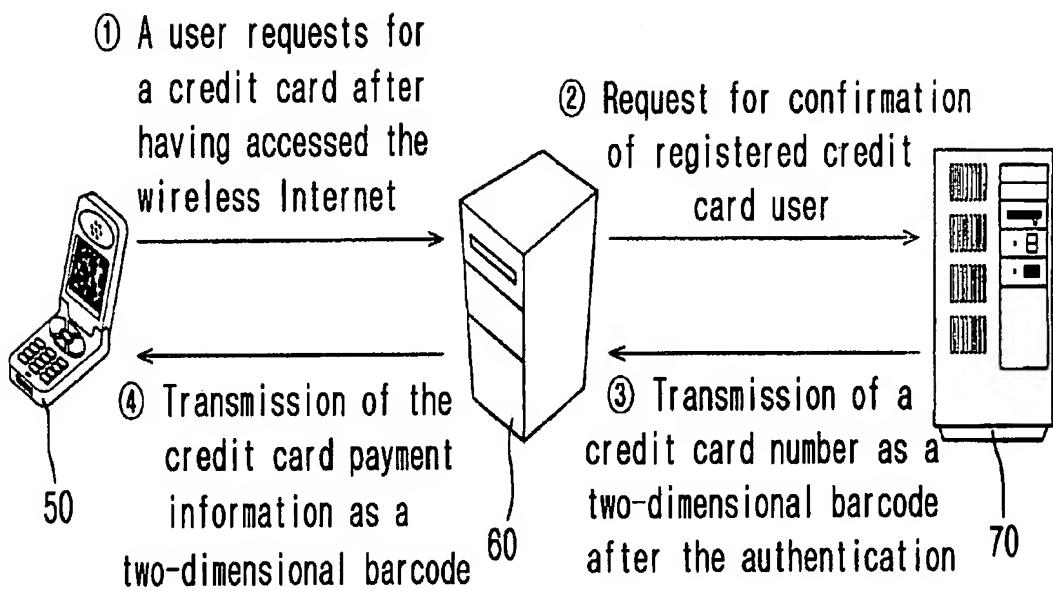
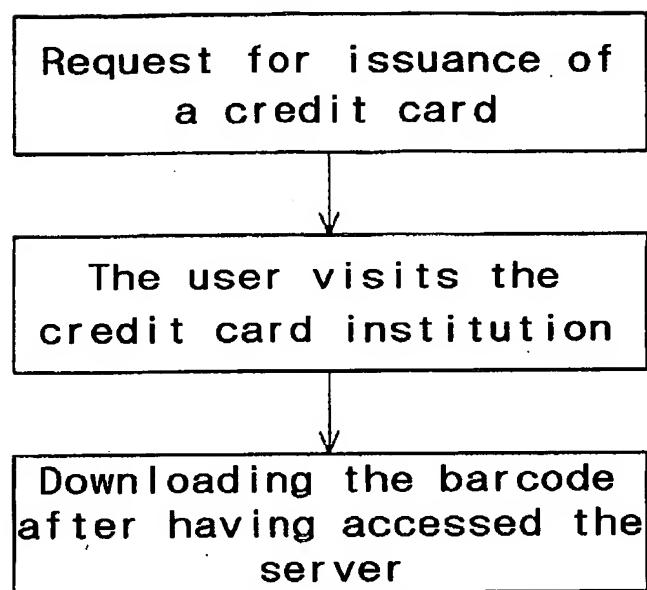
FIG. 4

FIG.5



INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR01/01981

A. CLASSIFICATION OF SUBJECT MATTER

IPC7 G06F 17/60

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7 G06F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

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Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	KR 01-79211(Jung, Jaem) 22 Aug 2001	1-6
A	KR 01-72523(Song, seonghan) 31 Jul 2001	1-6
A	KR 01-67931(Eione co. Ltd.) 13 Jul 2001	1-6
A	KR 01-8131(Park, Jungil) 02 Feb 2001	1-6
A	KR 00-7655(Samsung co. Ltd.) 07 Feb 2000	1-6

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See patent family annex.

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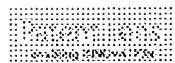
Date of the actual completion of the international search
26 MARCH 2002 (26.03.2002)

Date of mailing of the international search report
27 MARCH 2002 (27.03.2002)

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/KR01/01981

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
KR 01-79211	22 Aug 2001		
KR 01-72523	31 Jul 2001		
KR 01-67931	13 Jul 2001		
KR 01-8131	02 Feb 2001	KR 00-43495 KR 00-58948	27. Jul. 2000 06. Oct. 2000
KR 00-7655	07 Feb 2000		